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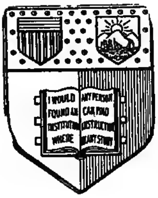
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ADVANCEMENT OF AGRICULTURE IN CANADA

EVIDENCE

OF

DR. WILLIAM SAUNDERS

DIRECTOR, DOMINION EXPERIMENTAL FARMS

BEFORE THE

SELECT STANDING COMMITTEE

ON

AGRICULTURE AND COLONIZATION

1905

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ADVANCEMENT OF AGRICULTURE IN CANADA

House of Commons,
Committee Room No. 34,
Tuesday, Februry 21, 1905.

The Select Standing Committee on Agriculture and Colonization met here this day at ten o'clock a.m., Mr. Thomas Greenway, Chairman, presiding.

Prof. Saunders, Director of Experimental Farms, appeared before the Committee and made the following statements:—

Mr. Chairman and Gentlemen, I esteem it a great privilege to have the opportunity of coming before you again to render some account of my stewardship in connection with the work of the experimental farms. It is 18 years ago since the Government entrusted me with this work, which I have been at incessantly since that time, and I hope it can be shown that this work has been of very great use in advancing agriculture in the Dominion and in bringing it up to that state of efficiency in which we find it at present.

THE CROPS OF 1904.

The season of 1904 while favourable for some crops in some districts has not, on the whole, been a very profitable one for the Canadian farmer.

In the Maritime Provinces very dry weather prevailed during June and the greater part of July, which considerably reduced the hay and grain crops; the straw was short, but rains late in July brought the grain up to a condition of plumpness which was fairly satisfactory. Later in the season the weather in the Maritime Provinces was more favourable and roots and other late crops were harvested in very good condition and in very satisfactory quantities.

In Quebec and Ontario better conditions prevailed, but rust on the grain was general, which reduced the weight of the wheat and oat crops very considerably. Barley, however, as usual escaped with very slight injury. The Fall wheat in western Ontario was considerably injured by winter, and this crop which has given an average for the past 23 years of 20·3 bushels per acre gave this year only 15:1 bushel.

In Manitoba the spring opened late, but there was sufficient moisture throughout the season and good growth was had, but rust was unusually prevalent on both wheat and oats in many localities, which reduced the weight of the crop considerably and lowered the value of the grain. The crops, however, in Manitoba, have turned out fairly satisfactory on the whole. Wheat has averaged 16·52 bushels per acre, and the total crop has been a little under 40,000,000 bushels, oats 36,000,000 and barley 11,000,000, giving a total grain crop of over 87,000,000 bushels. The wheat crop of the Territories has averaged a somewhat higher yield than in Manitoba and has, it is estimated, brought the total crop up to nearly 60,000,000 bushels. This added to the 13,000,000 produced in Ontario and the wheat grown in Quebec and the Maritime Provinces, will bring the Canadian wheat crop up to nearly 80,000,000 bushels, not a bad showing for a comparatively poor year.

COMPARATIVE EXPORTS OF WHEAT AND FLOUR.

While the exports of wheat and flour from Canada are large and her capacity for increase in wheat growing is almost unlimited, the exports of wheat from the United States are declining rapidly. Great Britain has taken the larger part of the United States surplus for many years. In 1902 the United States furnished Great Britain with nearly 81,000,000 bushels, about 54 per cent of her total needs. In 1903 the United States supplied only a little over 45,000,000 and in 1904 about 12,000,000. I might say that with regard to flour also the decrease is very marked. In 1903 the number of barrels of flour shipped to Great Britain was something over 7,000,000, and in 1904 it was a little over 4,000,000. From these figures it would appear that the United States will require for home consumption in future nearly all its own wheat and that shortly it may become a consumer of a considerable portion of the Canadian crop.

Such an unlooked for shortage in the United States might have produced serious inconvenience, but for the fact that unusually good crops have been had in Russia, India, and Argentina, which, added to the Canadian quota, made up the deficiency. The shortage of wheat in the United States is said to be so great now that some of their large mills must soon get more or less Canadian wheat or shut down.

In this contest with other countries for the production of wheat, Canada has many advantages. Within her borders there is an immense area of fertile land, there is a good climate which grows good crops of wheat of the highest quality. A large portion of the available wheat area in Canada is being gradually occupied by a steady influx of settlers. The relative productiveness of the soil in the Canadian North-west is shown by a comparison of the yields of the past year 1904. While the wheat crop of Manitoba has averaged 16·52 bushels per acre, and that of the North-west Territories about 18 bushels. North Dakota has averaged 11·8, Minnesota 12·8, and South Dakota 9·6.

These are figures from a recent publication of the United States Department of Agriculture. The total wheat crop of the United States for 1904 is given as follows:—

Winter wheat—acreage		26,865,855
“ crop	Bushels	332,935,346
Average yield per acre		12·4 bushels.
Spring wheat—acreage		17,209,020
“ crop	Bushels	219,464,171
Average yield per acre		12·8 bushels.
Total acreage		44,074,875
Total crop of 1904	Bushels	552,399,517
Crop of 1903	“	637,821,835

showing a falling off in production during the past year of something over 80,000,000 bushels.

Now that the United States is not likely in future to be a large exporter of her north-western wheats, our chief competitors in the British market will probably be Russia, Argentina, and India.

QUALITY OF CANADIAN WHEAT COMPARED WITH WHEAT OF OTHER COUNTRIES.

How the quality of our grain compares with that sent to the market of Great Britain by the countries named may be estimated by the prices they severally bring. Recent quotations in Liverpool were as follows.—

	Per bushel.
Canadian No. 1 Northern	$1 14
" 2 "	1 11
" 3 "	1 04
Best Russian	1 05
Argentine	0 99
Indian	0 91

showing a considerable margin in favour of such Canadian wheat as we have been able to send this year, which is below in grade what we usually produce.

There is practically no No. 1 Hard now on the market, but in past years No. 1 Hard has formed a very considerable part of our Manitoba and North-west crop. While the needs of Great Britain for wheat to feed her increasing population are growing greater from year to year the land under crop with wheat in that country is rapidly lessening in area.

The British wheat crop of 1904 is the smallest on record. The shortage is due partly to reduced acreage and partly to an unfavourable season. The total crop has been about 39,000,000 bushels as compared with 50,000,000 bushels in 1903, and 60,000,000 bushels in 1902. The average of the crop in Great Britain in 1904 was 27·72 bushels per acre as against an average of 31·97 bushels for the past seven years, showing that the British farmers also have had a very unfavourable season for their wheat crop.

SPECIAL WORK BY THE DOMINION EXPERIMENTAL FARMS.

Special work is being done in connection with the Dominion experimental farms to aid and stimulate wheat growing in Canada. Yearly demonstrations have been made of the best methods of cultivation, as to tillage, time of seeding, manner and depth of seeding, with illustrations as to how the several questions affect the yield. The great advantages of summer fallowing in the North-west and of early seeding in the East have been repeatedly proven. While no encouragement has been given to any varieties of wheat of inferior quality the desirability of sowing earlier maturing sorts of good quality in those districts where the season is short has been repeatedly urged. The work of originating new varieties by selection and by cross-breeding has been greatly extended, also the improving by selection of the yield and quality, and increasing the earliness of the best types among the standard varieties in cultivation; also to the breeding and selection of rust resisting sorts. In all such work progress is necessarily slow, but a broad foundation has been laid which promises well for the future.

The facilities now available at the Central experimental farm in Ottawa have been greatly improved by the recent purchase of a small roller mill by means of which two or three pounds of wheat can be operated on and flour produced which will compare favourably with that made from the same wheat in a commercial mill. An oven for bread making has also been provided so that a complete test as to the value of any wheat for the making of flour or bread can be thoroughly and rapidly made. A more reliable test can now be made of the quality of a wheat by the use of two or three pounds of the grain than could have been made ten years ago with several hundred bushels ground in a large mill. The fact that most of the larger mills in Minneapolis, also laboratories in Chicago, use these small mills with a baking plant to make determinations to guide the millers who have charge of the large mills, affords strong evidence of the reliability of the work done by these small plants. At a recent meeting of the Grain Growers' Association of the North-west Territories, Mr. Angus Mackay of Indian Head submitted he following regarding the early ripening of some of the new cross bred wheats produced at the experimental farms when compared with the red fife: 'In 1903 red fife was some five days earlier in field crops than huron and stanley'—these are the names of two of the cross bred wheats—'and was seven days later in ripening. In 1904 Red Fife was sown one day later than Preston and was ten days later in ripening. While Red Fife is one of the finest milling wheats in the world, it is late in ripening and in many districts it is liable to be injured by frosts before it is ready for harvesting. A variety equally good for flour and for the market which ripens even a few days earlier must prove a great boon to the settlers in the more northern districts and will do much towards extending the area of wheat culture.'

EFFORTS IN GREAT BRITAIN TO IMPROVE QUALITY OF WHEAT CROP.

While the acreage devoted to the wheat crop in Great Britain is decreasing, efforts are being made there to improve the quality of the crop grown by introducing wheats of better quality from other countries. It is over three years since this work was begun by the National Millers' Association of Great Britain and Ireland. A committee was appointed known as the Home Grown Wheat Committee, which was subsidized by funds from the National Millers' Association and also from the Government Department of Agriculture. The end and object of the labours of this committee has been to endeavour to obtain a wheat for growing in Great Britain which shall combine increased strength with great productiveness, so that those high yields per acre which have placed the United Kingdom at the head of all wheat growing countries may be maintained. One fact demonstrated by the experts who are conducting this inquiry is that the strong wheats of other countries can be grown in England without losing much of their strength. In carrying on this work wheats have been brought from many countries for test, but none have given better satisfaction than the high class wheats brought from Canada. It is seldom, however, that any of these give the large number of bushels per acre which the best of the winter wheats at present grown in England yield. These experiments are being continued along several different lines with the hope of getting more productive sorts. Much cross-breeding is also being done with the object of originating varieties of high quality specially suited to the climate. To expedite their work the British Committee have installed a small roller mill much like that which has been secured for similar work at Ottawa, a mill capable of handling a few pounds of grain and giving satisfactory flour therefrom. This small mill has given exactly the same results as to the strength of the flour as those which have been obtained from grinding the same wheat in a large mill.

By the Chairman:

Q. Have you made any test as to white fife?

A. We are making them. Dr. C. E. Saunders will appear before the Committee later on and submit, I think, some of the tests he has made with white fife. We are testing the different varieties of wheat as rapidly as possible.

By Mr. Henderson:

Q. Was not the production of wheat in the United States last year very considerably under the average?

A. I think not. Speaking from memory, it has usually averaged from 12 to 13 bushels.

Q. I meant the aggregate production?

A. Oh, yes, that has been about 80 million bushels less. There the area sown has also been less than it usually is.

Q. The question is, can we look upon this reduction in the United States production as of a permanent character?

A. Much will depend upon the price that can be got for wheat. The United States have a very much larger area of land in corn than they have in wheat, and some of that corn land can be converted into wheat land if it can be shown that the wheat crop would be a better paying one than the corn crop. Speaking of the actual crops, the crop last year of 637,000,000 bushels was, I think, one of the largest crops they have had.

Q. I thought that last year's crop was only 500,000,000 odd bushels?

A. I was speaking of 1903. The crop for 1904, was 80,000,000 less than that of 1903.

By Mr. Derbyshire:

Q. Is it not a fact that they are consuming more of their own productions at home?

A. Yes, the proportion of the wheat crop consumed in the United States is very large indeed, and I think fully three fourths of the corn produced is consumed at home.

By Mr. Cochrane:

Q. We understand that you have been experimenting in the production of flour, and in the quality of flour; how does the flour compare from wheat which you have produced by crossing new varieties with that which you have produced from the older varieties—in the production of flour and in the quality?

A. The flour made from some of the cross-bred wheats is of excellent quality and the quantity produced is satisfactory, but you will have fuller particulars on this subject when the Experimentalist comes before you. He will give you the report of what has been done; he has done much work along that line, and I do not wish to anticipate any statements he may have to make.

Q. What is the most productive wheat you have now?

A. The Preston wheat stands higher in yield at the experimental farms, on the average, than any other variety.

Q. What is the name of that wheat?

A. The Preston. It is a Red Fife cross.

Q. Is it a spring or a winter wheat?

A. A spring wheat.

By the Chairman:

Q. Have you any evidence as to whether it is more likely to be affected by rust? That it is more liable to rust than fife wheat ?

A. We have had no reports to that effect and we have tested it thoroughly on our experimental farms and have not found it specially liable to that disease.

By Mr. Henderson:

Q. Is it as prolific as red fife ?

A. A little more so, at least it has been in our eight or nine years' tests.

Q. Which winter varieties have you found to give the largest yield in Ontario?

A. The winter varieties we have not been able to test fully because we have no experimental farm where we can grow winter wheat with certainty. The Ottawa farm is the only one on which we grow it, and there about one year in three the plots are more or less winter killed, so that we cannot carry on experiments with winter wheat very successfully.

By the Chairman:

Q. Do you know anything about winter wheat grown in Southern Alberta?

A. Yes.

Q. What kinds are used?

A. The names of some of them are not known, but among others the turkey red and odessa are grown considerably. The total amount of winter wheat grown in Alberta is comparatively small as yet. It did not amount to quite 100,000 bushels out of 10 or 11 million bushels produced, and 60,000,000 produced in Manitoba and the North-west, so you will see that the growing of winter wheat there has not advanced yet very much. In my visits to the Mormon colony, and they are supposed to be the largest growers of winter wheat in Alberta, I found on the last occasion I was there that they were growing less winter wheat for the reason they can get a better price for their spring wheat and they say they can grow the spring wheat just as well. Much had been written about shipping flour from that district to Japan, for the reason that it was made from fall wheat, and was specially adapted for the purpose. I went to the mill to inquire into the matter, and the miller told me that it was all spring wheat they were grinding. So that, while winter wheat can be grown in that country, it has not yet been grown to any very large extent. The fact that it can be grown there is exceedingly interesting.

By Mr. Henderson:

Q. Does that apply to all parts of Alberta?

A. My remarks are intended to apply only to Southern Alberta.

By Mr. Herron (Alberta):

Q. I think I have understood that the country between Calgary and Edmonton was very suitable for winter wheat?

A. I think that this crop is only in the experimental stage there. There is not one that I know of that has produced any considerable area of winter wheat in that country. Some small plots have, I believe, been tried, and some claim to have been successful while others report unfavourably.

Q. With reference to fall wheat grown in the vicinity of Pincher Creek, we have been growing fall wheat there about 15 years, anywhere from 3 to 10 acres on each farm. I know one man in particular, who has grown it that long, and I can certify that he has never had less than 35 bushels to the acre under ordinary conditions for that length of time.

A. Is that at Cowley?

Q. No, that is at Catto's. I think you have met him.

A. Yes, I think I have.

Q. Last year in the vicinity of Pincher Creek we have grown, I think, over 100,000 bushels, and it was a poor season for fall wheat. Our wheat averaged 35 bushels to the acre there. As I say, there have been 100,000 bushels or more grown and we expect before long to grow half a million bushels there. There is ground enough under seed within ten miles of where I live to produce that quantity.

A. I wish it to be understood that I am not speaking disparagingly of the growing of winter wheat in Alberta. I have seen as good fields of fall wheat near Cowley, Alberta, as I have anywhere in the Dominion. I saw the year before last some very fine fields there.

Q. I gave you some samples from my own place there?

A. Yes, I had forgotten, I didn't recognize you for the moment. I think where fall wheat can be grown to produce 30 or 35 bushels to the acre from year to year it would be a profitable wheat for the farmer. The idea that fall wheat ripens so much earlier than spring wheat does not seem to be generally borne out. It is earlier in some districts, but in others it seems to take nearly the same time as the spring wheat does. That is what the settlers tell me; some varieties may possibly ripen later than others.

By Mr. Schell (Oxford):

Q. You said the average return in Manitoba was 16·52 bushels and in the Territories 18 bushels?

A. I was speaking only of one year. The average of ten years in Manitoba has been about 19 bushels. I was only speaking of 1904.

By Mr. Blain:

Q. Can you give us the average yield of wheat in all the provinces for 1904?

A. The information is not all available.

Q. As far as it is available, how much is it?

A. I have given you Manitoba and the Territories and as to Ontario, the spring wheat averaged 15·4 bushels per acre.

By Mr. Henderson:

Q. You said the returns in Ontario last year were 15·1?

A. Yes, that was the winter wheat. That occupies in Ontario a much larger acreage than the spring wheat.

By Mr. Miller:

Q. You have pointed out that the yield of wheat is much greater in the North-west and Manitoba than in the wheat growing States of New England. Do you consider that due to the different nature of the soil and climate or to the fact that the Americans have been overcropping their wheat land and reduced the yield? And is it probable that in our North-west wheat growing districts that by pursuing the same methods of cultivation as are now being pursued, and growing wheat year after year, that the yield will be reduced to the figures which you have given of the yield in the United States? And if that be true, can you suggest any better method of cultivation or use of the soil in the wheat growing district which would keep the yield up to a higher standard?

A. That is a problem we have been considering and experimenting on ever since we began work on the experimental farms in the west. There is no doubt that if you continue to take from the soil its fertility and do not put anything back, in process of time the crops will grow less. I do not think that is the cause of the present small crops in the United States, because their fields, many of them, have not been cultivated much longer than some of the fields in the older settled parts of Manitoba, and yet they do not get the same crops—I think mainly for the reason that they are such poor farmers. I was through North Dakota last year just after harvest, when the wheat was in stock, and while in Manitoba and the Territories almost every second farmer had more or less of his land in summer fallow—which is well known to be a great factor in helping to bring up the average of the crop—when I got past the boundary a little way I saw no more summer fallows. That in itself is evidence that the cultivation of grain in the American North-west has become of a careless and indifferent character. The farmers do not appear to lack industry. It happened to be Sunday when I was passing through, and I noticed in many places that threshing was in progress. Our people do not believe in working more than six days in the week and by treating their land intelligently they bring out much better results.

By Mr. Christie:

Q. In that part of Dakota I have always understood that they are almost all Canadians, old Ontario farmers who went there?

A. If so, it does not speak well for them.

Q. Fifty per cent at least are Canadians ? I only tell you what I saw

A. I do not know as to that.

THE CHAIRMAN.—They got badly contaminated.

By Mr. Jackson (Selkirk):

Q. The Chairman raised a question. In the district from which I come one of their crop is prestion wheat, and it suffered much from rust.

THE CHAIRMAN.—That is my experience.

WITNESS.—Many farmers have reported the results they have had with Preston wheat, but I cannot recall any instance where it has been said to be specially liable to rust.

Mr. CRAWFORD.—If you grow it on very heavy clay soil the yield is fine.

Mr. JACKSON.—It is liable to rust.

By the Chairman:

Q. Last year was our first experience of rust to any extent?

A. It was a very unusual year, and it is an experience that we may not have again. While we are on Preston wheat, I happen to have a letter here——

By Mr. Lewis:

Q. What is Preston wheat a cross of ?

A. Red fife with ladoga, and one of the advantages of this wheat is that it is from four days to a week earlier in ripening; and strange to say when the season is a late one like last year the period of ripening of the later sorts is drawn out and these early varieties are able to assert their early ripening tendency more strongly in a season like that of last year, making them an average of ten to twelve days earlier than red fife.

By Mr. Lewis:

Q. Is it a bearded wheat?

A. Yes.

Q. What is ladoga wheat ?

A. It was a wheat brought from Lake Ladoga, north of St. Petersburg, the first year the experimental farms were started, and it was found to be a week earlier than any of our wheats under cultivation then in the North-west. Its cultivation was continued until we could get enough of the wheat to have its value for flour making tested in a mill. It was found that the flour was decidedly yellower in colour than red fife, and as this was considered to be a serious objection to its general introduction, we ceased to distribute it or to recommend it for cultivation. In the meantime samples were sent to the Peace River country, where the season is short and there farmers have found it to be so advantageous on account of its earliness that they grow no other wheat. They don't mind the little yellow tint in the flour, and it makes very good bread.

By Mr. Jackson (Selkirk):

Q. Manitoba wheat buyers are much down on Ladoga?

A. Very few of them know it when they see it. There is a good deal of sentiment in these things. I understand last year that a man wrote and asked a certain buyer how much he would give him for Preston wheat and he replied, 'I only buy red fife.' The farmer asked if he bought Mr. So and So's wheat, and the buyer replied that he did and paid him the highest price for it, whereupon the farmer informed him that that was prestion wheat.

By Mr. Conhrane:

Q. Here is a point. You put great stress on summer fallowing. How does that add to the fertility of the soil—by cultivation or by some scientific process?

A. The cultivation of land in that way—summer fallowing as carried on in the North-west—has a good effect in several ways. It conserves moisture by breaking up the capillary structure of the soil and turning the moisture down where it is retained, and does not find its way to the surface as under ordinary cultivation. The land is turned over to the action of the sun and air, and insoluble plant food in the soil is changed to soluble and available forms. It also destroys a vast host of weeds which would otherwise during their growth pump the moisture from the soil and deprive the growing grain of the water needed for the crop.

The CHAIRMAN.—I think your exposition of it is about correct.

By Mr Schell (Oxford):

Q. I suppose more comes from the loosening or making available th constituents that are in the soil for plant food, putting it in a soluble form?

A. There is no doubt that is a very important point. Some people say the moisture is the most important part. The killing of the weeds is also of the utmost importance because no man cultivating in the North-west can entirely keep out weed seeds. They are blown over the plains all winter long and the wind scatters the seed no matter where a man may be. But by this method much may be done to keep the land clean for the season. The conservation of moisture is also an important advantage arising from summer fallowing.

By Mr. Cochrane:

Q. Do they plough and cultivate the crop?

A. In summer fallowing the land is left vacant for the year.

Q. I understand that. I am talking about the cultivation.

A. The land is ploughed once and usually cultivated a couple of inches deep with a shallow cultivator twice during the season. The cultivator breaks up the surface, and this forms a mulch which serves to keep the moisture in the ground from finding its way to the surface.

By Mr. Crawford:

Q. The result of our experiments has been that we have given up summer fallowing because we cannot clean our farms with it.

A. Why? Cannot you cultivate it?

Q. We cultivate it, but when we do we get too much straw, and not enough crop.

A. In a wet season the growth I know is very strong with such treatment, but taking the average of a series of years, the farmer will, in my experience, be much better off if he summer fallows his land every third year.

By the Chairman:

Q. The result of my experience is that I would rather have two crops of barley.

A. You would sow it thick, I suppose, to keep down weeds?

Q. The barley cleans it out. We have so much heavy vegetable mould.

A. It blows when it is summer fallowed?

Q. Yes.

A. But taking the country where the soil is firm, a good clay loam, and I do not think you will find one farmer in ten who will not stand up for the advantages of summer fallow.

Q. Where you have land that is very heavy, in summer fallow, you are almost sure to have too heavy a crop.

A. That is sometimes a source of trouble on a very fertile soil when the season is wet. There is another point involved in the question asked as to how the fertility of the soil might be retained. The experiments we have been trying in the past have been mainly along the line of substituting for the bare summer fallow a crop of clover. We have tried the common red, the mammoth and the alsike We have had a certain amount of success with these experiments and it seems to me that that is probably the only way in which large areas of land in Manitoba and the Northwest can be fertilized. It gives them a supply of humus which they will need eventually, and also a quantity of nitrogen.

Q. Has the growing of clover been a success at Brandon?

A. It has to a considerable extent. The half acre plots grown last year were quite a success; this year we are working on larger sized plots.

With red clover ?

A. Yes, red clover.

Q. Can you give any reason for the average of the crops in Manitoba and the Northwest being so very much less than those reported at the branch farms?

A. That is a subject not easy to explain. It is the same in Ontario. You take the different crops we get at the experimental farms of oats which in field cultivation will give us 50 to 60 bushels, while the average of the province is about 38 bushels. We treat the land just as any farmer ought to treat it.

Q. You manure it extensively, perhaps?

A. That is all explained in our reports; we do not manure it any heavier than most good farmers would, and many use manure more freely than we do, but there are many poor farmers and they bring down the average very much. Take potatoes, which is a still more striking example. We get from 300 to 400 bushels; the average in Ontario for the past twelve years has been only 115 bushels.

By Mr. Cochrane:

Q. That is on the experimental plots?

A. Oh, no, we often get 500 bushels per acre on the experimental plots,; the 300 bushels is for field cultivation

By Mr Lewis:

Q. You said the English farmers grow very much more wheat to the acre than we do. Would the fact that they sow thinly in Manitoba have anything to do with the difference? and would continual cropping for several years effect the result?

A. The conditions in England and this country are very different. Their wheat is nearly all winter wheat, their land is different, prepared with greater care and the climate is mild and favourable and their growing season is longer.

Q. What do they sow to the acre?

A. They sow a larger quantity of grain to the acre than our farmers do; one reason why they sow heavily is that they get by doing so a heavier crop of finer straw, and straw with them is worth almost as much as the grain.

By Mr. Cochrane:

Q. Do not climatic influences and the seasons have something to do with it, the longer season and the moister climate, and the fact that they have sunlight much longer?

A. These are all important factors, but we have not found thick seeding specially advantageous in this country. We have been carrying on experiments at the farm at Ottawa for several years in the sowing of different quantities of seed, with oats beginning with a bushel and a half and carrying it up to four bushels, on plots alongside each other. We have also conducted some similar experiments with barley and some with wheat. With oats we find we get the better crop by using from 2 to 2½ bushels; with three to four bushels we have usually had much lighter crops. There are very few farmers in England or Scotland that sow less than four bushels of oats to the acre, and they say they get much better results than with lighter seedings.

By Mr. Kennedy:

Q. How did you find the farmers doing in British Columbia, where the climate is somewhat similar to what it is in England?

A. They sow about 2½ bushels in British Columbia; I do not think they exceed that. We sow about two bushels, and our crops, I think, are as heavy as theirs.

By Mr. Herron:

Q. Doctor, I want to ask if you have any record of the cultivation of sugar beets in the Northwest, showing whether there is a large area of our country adapted to the growing of sugar beets, and if they are a success where they are grown?

A. That question seems to come as a break in the middle of this wheat business. I would like to finish with that.

Would you allow me just to read this letter I have in my hand in reference to preston wheat. It is from Sergeant Major F. Coles (late 20th Hussars), Moffatt P. O., Assiniboia, N.W.T.

14th November, 1904.

Dr. Saunders:

Dear Sir,—I beg to inform you of the great success of the Preston wheat in this district. The demand for seed this year is greater than ever. Many who tried it for the first time this year, intend sowing a great deal more next year. Preston wheat has done much good in this district. You will be doing the farmers in the Northwest Territories (where it is difficult to grow Red Fife successfully) a very great favour by drawing the new settlers' attention to this excellent early variety. I cut my Preston wheat on the 20th of August; many of my neighbours could have cut it at least seven days earlier. The yield on my farm was 35 bushels to the acre.

Trusting you will long be spared to continue in the work you are engaged in.

Believe me,
Yours truly.

That is the only letter I brought about preston wheat, and I thought it well to bring it to show that while some may have had unfavourable results, others speak favourably of it. The results at the experimental farms were favourable. I wish again to repeat that we do not advocate the growing of other varieties of wheat where red fife can be grown successfully, without injury from frost. We believe this is one of the best wheats we can grow, and that in many districts, especially in Manitoba, if red fife is sown early enough it will ripen well in most years.

By Mr. Christie:

Q. Red Fife is not so good in Ontario?

A. We find it a good wheat here. We have done more work in the way of disseminating pure red fife than with any other wheat, but we cannot ignore other varieties, especially the earlier sorts, some of which seem equal in quality and almost equal in productiveness. I am one of the strongest advocates for red fife, but if a farmer writes and tells me that he has tried it and it has ripened too late in his locality, I advise him to try some earlier ripening sort.

By Mr. Sproule:

Q. You spoke of the total wheat production of the United States being 600,000,000 bushels. Have you any data to indicate what is the consumption of wheat in that country?

A. For some years past, until 1902, they have had a surplus, speaking roughly about 200,000,000 bushels to export.

Q. It is claimed by some that their consumption has almost overtaken their production. Have you any figures comparing last year with two or three years previous to that?

A. Were you not present when I gave these figures——

The CHAIRMAN.—Dr. Saunders gave the figures before you came in.

WITNESS.—In 1902 the United States sent to Great Britain over 80,000,000 bushels, in 1903 they sent only 54,000,000 bushels, and last year it came down to 12,000,000, and there was a decrease also in their exports of flour.

HOUSE OF COMMONS,
COMMITTEE ROOM NO. 34,
THURSDAY, February 23, 1905.

The Select Standing Committee on Agriculture and Colonization met here this day at 10 o'clock a.m., Mr. Greenway, Chairman, presiding.

Professor Saunders, Director of Dominion Txperimental Farms, again appeared before the Committee and was heard, as follows :—

THE GROWING OF CANADIAN WHEAT IN ENGLAND.

Mr. Chairman and Gentlemen, When I was with you on Tuesday I was talking over the subject of wheat, and I made the statements that the experts of the National Miller's Association in Great Britain and Ireland had been trying the red fife wheat of Canada and had grown it for several years without its losing anything material in quality. Yesterday I happened to get a sample sent to me of red fife grown three years in Great Britain from a bag of Red Fife grown at Indian Head which I sent over from here.

By the Chairman:

Q. How long has it been grown?

A. Three years. It was sent over in 1901 from Indian Head, and grown in 1902 at Wye in Kent. I have not the record of 1903, but in 1904 it was grown at Faversham, and it produced a crop of 43¾ bushels per acre grown alongside the Golden Drop, one of their soft varieties, which produced 41 bushels, showing that it not only has maintained its quality, but that it has in this instance developed an extraordinary crop producing power. The expert tells me that their baking tests are indicated by a series of numbers running from 1 to 100, and that while the golden drop rated 56 in the baking contest this red fife rated 87, showing the high quality of the wheat.

I thought it would be interesting to bring this sample to your notice as all these experiments in England with our wheats help to bring Canada into notice.

OATS AND BARLEY.

Passing on to the subject of oats, these cover the largest acreage of any of the grain crops in eastern Canada. In Ontario alone, the area occupied by this crop in 1904 was 2,654,936 acres, which gave a crop of 102,173,443 bushels, equal to 38:5 bushels per acre, which was about 3 bushels above the average of the past 22 years, showing that we are not only growing an increased acreage, but that we are obtaining a higher yield per acre. In Manitoba also this crop has increased considerably and last year nearly a million ocres were under cultivation, giving a crop of 36,250,000 bushels, with an average yield of 38:8, showing that Manitoba is quite equal to Ontario in regard to the average yield of oats. I do not think it is on account of any better conditions, but mainly for the reason that the Banner oat is grown nearly all over Manitoba, which is one of the most productive varieties and it is largely perhaps a question of variety. The oat crop of Manitoba in 1904 was four times what is was in 1900, showing how this crop is increasing. The production of barley is also increasing rapidly. For the ten years prior to 1890, the average barley crop of Ontario was '20,000,000 bushels. Of this amount 10,000,000 bushels approximately were sent annually to the United States, for which on an average about $6,500,000 was received by the Ontario farmers. When the McKinley Bill came into operation, with its prohibitive duties, I think it was in 1890, this market was suddenly and totally cut off, which obliged Canadian farmers to rearrange their crops, and they forthwith dropped a large part of the barley crop, so that two years later the total barley production of Ontario, instead of being 20,000,000, was reduced to less than 10,000,000. In the meantime, however, the farmers became convinced that the surest outlet for their surplus products was Great Britain and their best plan to adopt was to feed these coarse grains and convert them into finished animal products, notably cheese, butter, eggs, beef, pork and mutton. Following this plan, a large trade has been built up and the barley crop increased until this last year it amounted to 24,500,000 bushels in Ontario alone, with an average crop of 31·8, whereas in 1890 the average crop was about 21 bushels, showing that not only has an increased quantity of barley been produced, but by improving the land, feeding this barley or oats to stock, and putting the manure obtained on the land, it has been brought into better condition, so that the average crop has been raised very materially.

SMALL QUANTITY OF COARSE GRAINS NOW EXPORTED.

It is interesting to notice in this connection how small a proportion of these two large and mportant crops, barley and oats, is now exported. The total oat crop of the Dominion is upwards of 200,000,000 bushels per annum, and the total exports for the past year were 4,695,000 bushels. Part of this we know went over in seed to Great Britain, as there is a considerable demand there now for our Banner oats, but the figures given show that the exports are very trifling when compared with the production. The barley crop will probably amount to 50,000,000 bushels, and of this 1,057,470 bushels were exported last year. By feeding these coarse grains at home and the use of the manure produced, the Canadian farmer is enabled to restore to the soil a very large part of the plant food which the crops have taken from it during their growth.

MAINTAINING THE FERTILITY OF THE SOIL.

The maintenance of the fertility of our land so as to provide for a continuance of good crops is a subject of the greatest importance, and has been carefully considered and experimented with on the experimental farms ever since their organization. The preservation and handling of barnyard manure so as to avoid waste has claimed much attention. Convincing testimony has been furnished by the results of experiments on the farms of the great value of manure fresh from the barnyard as compared with rotted manure. It has been shown very clearly that a ton of fresh manure is equal in crop producing power to a ton of rotted manure and that it takes two tons of fresh manure to produce one ton of rotted manure. When you consider that the manure produced in solids and liquids by the farm animals in Canada amounts to about 100,000,000 tons per annum, which is considered a conservative estimate, and that each ton of this valuable fertilizer may be estimated as worth about one dollar, it is easy to see the importance of this question. On the use of this material the farmer's hopes of maintaining the fertility of his land are mainly based, and while many handle it with judicious economy, many others recklessly waste this useful material.

Q. Burn it?

A. Burn it, yes.

By Mr. Wright:

Q. Is that really so, that this green manure is equal in value to the rotted manure?

A. In explanation of that statement I might say that we have carried on experiments along this line for 16 years. For the first 10 years a plot of land was manured each season with rotted manure and another plot alongside with green manure, and for ten years the oat crop on the average was four or five bushels more per acre on the land where the green manure was used than on the rotted. The wheat crop was just about equal on both plots, and in the case of the barley crop the advantage was a little in favour of the green manure. But practically it is safe to say that in crop producing power a ton of green manure from the barnyard is equal to a ton of manure that has been rotted. The reason for that is apparent, when you consider that the liquid manure, which is by far the most valuable and richest in plant food, is nearly all dissipated in the process of rotting; the nitrogen it contains is lost in the form of ammonia, and the potash and phosphoric acid is more or less leached out and wasted during the process. The results of these tests conducted for a series of ten years on the same crops, on the same ground, and applying the same quantity of manure each year showed there is no advantage so far in rotting manure, while there is a loss of at least half the weight of the manure.

By an Honourable Member:

Q. Is the green manure not more dangerous for carrying weeds?

A. There is an objection to fresh manure on this account, but we always use manure on a root or other hoed crop, where a few more weeds would not materially signify, as they would all be destroyed in the clean cultivation which follows. This, however, is a point every farmer should consider for himself.

By an Honourable Member:

Q. Your green manure would include a lot of unrotted straw, would it not?

A. Yes, more or less. Straw rots in the soil more promptly in eastern Canada. That would be an objection to it in Manitoba, where the moisture is often not sufficient to rot the straw in the ground. There the manure would need rotting before it is applied.

By Mr. Wright:

Q. Then you have the advantages of the heating properties of green manure. While it is rotting the underheat helps very materially?

A. Yes, it would give additional warmth to the land, and probably hurry the crops along more or less.

BENEFICIAL RESULTS FROM THE PLOUGHING UNDER OF CLOVER.

Much attention has also been given to the growing of clover and other leguminous crops, and ploughing them under with the object of adding to the fertility of the soil. These crops take nitrogen, which is one of the most expensive of fertilizers, from the air and store it in their tissues, and when ploughed under these decay and furnish food for subsequent crops. The results of many experiments have shown quite a large increase, both in grain and straw, where clover has been ploughed under as a fertilizer. In these experiments clover seed has been sown with the grain in the spring. After the grain has been harvested the growth of the clover has been rapid, and by about the first week in October a thick mat or foliage has been produced ten or twelve inches in height. This has been turned under about the middle of the month so as to be ready for the sowing of a grain crop very early the following spring. By this method the greatest advantage is realized from the clover without interfering with the regular succession of other crops. In these experimental plots we have always had alongside some beds containing no clover for purposes of comparison. Clover in common with other leguminous plants has the power, as I have already said, of taking nitrogen from the air. That is accomplished through the agency of minute bacteria, which attach themselves to the roots of these plants, forming thereon small nodules varying in size from a pin's head to a pea, in which these bacilli or bacteria are colonized. The nitrogen taken in by these colonies is converted into soluble compounds and stored in the tissues of the roots, stems and leaves.

By the use of clover in the manner I have indicated, the soil is enriched by the addition of nitrogen taken from the atmosphere. There is also an increase in the store of mineral plant food in the surface soil from the deep rooted system of the clover which forages deeper than almost any other plant can reach and brings up phosphoric acid and potash, and places that also at the disposal of subsequent crops. Further, there is a large addition of humus from the decaying roots, stems and foliage of the clover, and this added humus or vegetable matter enables the soil to hold more moisture, and as all plants must take up their food by means of water this is of very great importance to all crops during the growing season. The clover also acts as a catch crop during the autumn months retaining and utilizing fertilizing material brought down by the rain. The bacteria referred to colonized in the nodules on the roots of the clover are necessary for the vigorous growth of clover, and the fact that clover can be grown successfully in most of the settled parts of Canada is evidence that these bacteria are almost universally present. There are, however, localities where it is said the bacteria are scarce or wanting. In such cases a few sacks of soil taken from an old clover field and scattered over an area where clover has failed to grow will usually give it a start, the bacteria multiply rapidly and clover may usually be grown thereafter on that soil without difficulty. As the transportation of soil to start bacteria is rather cumbersome, concentrated cultures of these micro-organisms have been made and the seed of the clover treated with them before sowing. The first cultures of this sort made in Germany were tested at the central experimental farm in 1897 to 1899, and the results published in the annual reports for those years. The culture used was known as 'Nitragin', and while some increase of crops was had from its use, the preparation soon lost its vitality and the results were not such as to warrant any general recommendation of its use and its manufacture was subsequently given up. Recently an improved culture has been made which is said to retain its activity for a much longer period and to be much more effective than any of the older forms. This preparation is mainly the result of the work of Dr. Geo. T. Moore, one of the staff of the United States Department of Agriculture, and this new method of inoculating the soil most of you have probably seen references to in recent magazines and newspapers because it has been the subject of a great deal of comment. By the use of this culture the seed may be inoculated before sowing and very excellent results have been obtained in districts where the land is poor and unfavourable to the growth of legumes. Fortunately in most parts of Canada these bacteria are abundant in the soil and most of the leguminous crops grow well, hence there is not the same need for inoculation. Experiments with the cultures referred to are, however, being made at the several experimental farms, and we shall be able to report more fully on this matter in another year or two. Where clover grows freely it is an indication that inoculation is not of much importance, but where there is any difficulty in growing clover then the usefulness of this system of inoculation will no doubt be much greater. Where the land is poor and clovers have not hitherto been grown, the use of such culture will often prove a great benefit by giving the crop a successful start.

EXPERIMENTS WITH CLOVER DURING 1904.

During the season of 1904 the experiments in the ploughing under of clover resulted in a large increase in crops. Seven experiments with banner oats gave an average increase of 12 bushels 11 pounds of grain per acre, and an increase in weight of straw of 1,352 pounds per acre. Six experiments were tried with Indian corn, which resulted in an average increase of 5 tons 1,516 pounds of corn cut green for ensilage. Eight experiments were also made with potatoes, which gave an average increase of 39 bushels 37 pounds per acre. Fuller particulars of these experiments will be found in the Annual Report of the experimental farms.

ANNUAL DISTRIBUTION OF SEED GRAIN FOR TEST.

The annual distribution of grain for the improvement of seed among the farmers is again in progress, and up to the present date (February 27) 11,604 samples have been sent out, these samples weighing, in the case of barley and wheat, 5 pounds each, and in the case of oats, 4 pounds each. I have here with me samples of some of the leading varieties of grain that we are distributing.

By the Chairman:

Q. You are speaking of banner oats; do you find them the best?

A. We find the banner oats give the largest crops of any of the oats that we have been growing, taking them all over the Dominion, and it is the principal oat grown in Manitoba. I think the large crops had in Manitoba are largely due to the sowing of that variety. The oat crop in Manitoba is usually the last to be considered, and is generally put in on any sort of land which happens to be left, or which is more or less unfit for wheat.

By Mr. Wright (Renfrew):

Q. Do these manufacturers where they manufacture so many cereals, say at Peterboro'—is there any particular kind of oats they prefer for the manufacture of their breakfast food?

A. The breakfast foods are usually made from wheat. I do not know of any of them made from oats except oatmeal and rolled oats. The oatmeal manufacturers require an oat fairly long, and they can use the banner very well. They have also found the holstein prolific a good variety. That is a subject we have under investigation just now. We are corresponding with the oatmeal millers, and have submitted samples to them to find out which they prefer in certain parts of the Dominion. The welcome and the Scotch potato oat, both of which are short, are most satisfactory for this purpose. We have had this matter in mind in our distribution of grain, and have endeavoured to avoid sending out any variety of oat, to any extent, which would not be acceptable to the oatmeal miller, because this is an industry that ought to be encouraged.

By Mr. Rousseau:

Q. How does the Siberian oat compare with others in yield?

A. It does not stand as high as the Banner. The relative position they occupy can be easily found by reference to one of our crop bulletins. The Banner stands first, and the Siberian will vary from the 10th to perhaps the 15th in the list. There is no very great difference, and the Siberian has done well on the whole. It is an oat we are growing regularly alongside of the other varieties, and in some parts of the country it does better than it does with us. Samples of the Banner oat were sent to Scotland at the request of the Superintendent of the Agricultural Farm at Glasgow some four or five years ago, and this oat is now very generally distributed over Scotland. The information we have from there shows that it is an oat which readily adapts itself to different conditions of climate and soil, and it seems to have an advantage there over many other sorts.

Q. Are these samples of seed grain you are distributing grown in Ottawa?

A. No, they are mostly from Indian Head.

By the Chairman:

Q. This Red Fife?

A. That is from Indian Head.

By Mr. Schell (South Oxford):

Q. Have you any experience with the Black Mane oat, which was formerly grown rather extensively in some districts?

A. We have not found it to be such a heavy yielder as some of the white varieties, although it has a good reputation in some quarters. It has never yielded as heavily as the Banner or some other white varieties. The oat mill men will not buy an oat which has been grown in a district where black oats are raised, if they know it, for fear that black oats will be mixed with the white, and that their product will thus be injured by the mixture. Oats grown in a district where there are no black oats raised will bring one cent a bushel more as a rule. Black oats are not as good sellers, and not as good croppers, and we have not encouraged growing them, and have thought it best not to distribute them, although we always grow a few varieties of black oats in our experimental plots so as to be able to give information regarding them.

Q. How does the Green Russian do?

A. That is an oat with which we have had no experience, except during last season at Brandon. It is said to have done well there. We heard of it during the winter, and have procured some for sowing in the spring at the different experimental farms. We are not in a position yet to say how it will turn out.

By Mr. Clements:

Q. Do you advocate the sowing of these samples in Ontario?

A. Certainly. These Banner oats for instance (referring to sample) are from the field crop at Indian Head, which gave 115 bushels to the acre. I am firmly of the opinion that it is an advantage to sow seed from a prolific strain; that it is much better for a farmer to have a sample for improving his seed that comes from a field where 100 bushels or more per acre were produced than where 50 bushels only were grown.

By the Chairman:

Q. Do you change from here to Manitoba for instance?

A. We get some for distribution from Manitoba.

Q. Do you change from here to Manitoba?

A. We have sometimes procured seed from Manitoba, for test here, but there are so many things affecting the crop every year we have not been able to say how far any difference in crop may be due to the change of seed. This is a very difficult problem to deal with.

By Mr. Clements:

Q. Can you grow Manitoba wheat here with success?

A. Yes, quite successfully. Red Fife grown in this district last year was milled in Minneapolis in comparison with Red Fife from Manitoba and the Territories, and produced just about as good flour with but a very small shade of difference. I had been under the impression that it would gradually deteriorate here, but the experiments I have referred to which have been tried in England point to a different conclusion, and I always hold myself ready to change my views when necessary to bring them in accordance with the facts.

Q. In either case, you sow Manitoba wheat here in the spring?

A. Yes, this Red Fife from England (referring to sample) was, I understand, sown in the autumn. They have tried sowing in the autumn and in the spring, and I think the large crop spoken of is probably due to the sowing in the autumn. It was sown in comparison with the Golden Drop which was a winter wheat.

Q. A number of people in my section sow their spring wheat in the autumn?

A. What section is that?

Q. West Kent, near Essex, on hard clay land.

A. I did not know that that was customary there.

Q. Their average yield has been about 23 to 24 bushels to the acre. I did not know this myself until last season.

A. That is about the same yield as winter wheat. I am glad to get that information.

By Mr. Wright (Renfrew):

Q. Our mills in Renfrew stopped bringing wheat from Manitoba to distribute to the farmers to sow because they found it does not mature properly?

A. I am surprised to hear that. Your growing season in Renfrew is, I think, quite as long as it is in Manitoba. Do you think this matter has been investigated with sufficient care?

Q. It does not grow quite as well?

A. And does it not produce as good a crop?

Q. No?

A. This difference may arise from an unfavourable season, and the only way to show that it is due to the variety would be to grow other varieties alongside of Red Fife in the same soil on the same farm and compare them.

I was just beginning to refer to the distribution of grain. This goes on quietly every year and very few people know what an amount of labour and preparation is required to carry it on. During the past six days we have received 6,670 letters from farmers applying for samples of grain—over 1,100 a day—and we had been getting 500 or 600 per day for a month or so before this. This will not last long now, as the time for receiving applications expires on March 1, and after that date they fall off rapidly. There go out from the farm at Ottawa every year about 35,000 samples, to about that many farmers in different parts of the Dominion, and since this work was begun 18 years ago, over 450,000 samples have been sent out. Some farmers apply every year for a sample of some sort, while others apply only two or three times, and then having some of the best sorts, they are satisfied. I think that the probabilities are that we have supplied somewhere in the neighbourhood of 200,000 farmers during that time with good varieties of grain. There is not a part of the Dominion from the Atlantic to the Pacific where you would not find progressive farmers who had received samples from the Experimental Farm, and in most instances they are doing well with them.

By the Chairman:

Q. While you are on that point, there is an agitation in some parts in favour of sending out larger samples. I wish you would point out to the committee the difficulty of that?

A. That agitation has been going on more or less for some years, and has been confined, I think, to Manitoba and the North-west Territories. The objectors say that the quantity now sent out is too small, and that we should send to each farmer not less than two bushels. It would be quite impossible to supply the quantity of grain which such a distribution would require unless it were limited to comparatively few individuals, which would be unfair and impolitic. It has been the practice at both the western farms for many years to sell to farmers in quantities of two bushels and upwards all the surplus stock remaining after the samples have been supplied.

By Mr. Barr:

Q. How much do you send out?

A. We send out four pounds of oats and five pounds of wheat or barley, which is enough for one-twentieth of an acre in each case. Instructions are given as to the size of the piece of land to sow it on, and when the return is sent in we can figure out how much it has yielded per acre.

By the Chairman:

Q. How does that come? Is that the largest weight the mail will take?

A. Yes.

By Mr. Schell (Oxford):

Q. There is no charge for the samples?

A. No.

By Mr. Gunn:

Q. Any farmer can get it?

A. Yes. A circular is prepared, usually in November or December in each year, announcing that the authorization of the minister has been received for another distribution of grain, and the names of the different varieties available are given. The farmers are advised that a sample can be obtained by writing to the Experimental Farm. No postage is required, and everything is made as easy for the farmer as it is possible to make it. This notice is sent to every newspaper in the land, from the Atlantic to the Pacific, about 900 of them. Some of them do not put it in because it is not sent as an advertisement but as an item of news. If the editor thinks it is of sufficient importance to publish in his paper as a news item he is asked to put it in the next issue. I suppose one-half or perhaps two-thirds of the newspapers put it in, so that it gets a wide circulation in that way, and the announcement reaches a large proportion of the farming community. There is another way in which the distribution is widely advertised. As soon as the samples begin to go out, which is early in December, farmers receiving them tell their neighbours about it, and in the country such items of news travel rapidly.

By Mr. Henderson:

Q. Must the application for samples be made personally, or can one farmer apply for himself and a half a dozen others?

A. The rule is to have them made personally, although it is not strictly enforced in every case. Farmers in a community who cannot write sometimes put their mark opposite their names on a neighbour's list, or a farmer may ask a neighbour who is writing to apply for him also. Whenever we are satisfied that the applications are from individual farmers, and that the samples are simply for themselves they are sent; that is, when only two or three names are included in one letter.

Q. Would you send one farmer one sample?

A. Just one sample.

Q. One sample of each?

A. No; one sample only.

Q. Supposing I might request three or four samples to be sent to certain farmers, you will pay no attention to that?

A. I would, most certainly. I would send them, with the greatest pleasure. But if you sent me a list of 200 or 300 names I should hesitate to supply such a list, as it is quite probable that in such many would receive samples who had already applied for themselves. It is bad policy to duplicate such samples. Some years ago it was the custom to take such lists from members, when our distribution was not so large as it is now, and some would send as many as one or two hundred names in a list. We kept account of these for some years, and we found that the returns which we ask from each party to whom samples are sent, on a circular accompanying each sample, were very seldom received. On this circular were questions as to the date of sowing, the date of ripening, how the soil was prepared and how the seed was sown, with the weight of threshed grain harvested, the character of the straw, and the comparative earliness of ripening and weight of crop, &c. We asked them to make the returns upon that circular. Such information is very useful, as it permits of a reliable opinion being formed as to the suitability of any special variety of grain to a particular district. From names sent in on these large lists only four per cent gave us the information asked for, whereas we obtained replies from 30 per cent where we had sent samples in reply to individual applications. When this fact was brought to the notice of the minister, instructions were given me to send the samples only on personal application.

Q. What provision is made against farmers clubbing together and sowing a number of sample packages in the one patch?

A. There is no objection to their doing that. We want to get the individual sample to every farmer who desires one. We have been carrying on this distribution for many years, and the result is that there is hardly a district in the Dominion in which there is not now more or less good seed which has been obtained in this way. Farmers are sometimes very careless about cleaning their seed properly, and they will get their Red Fife mixed with a bearded wheat, which lowers its value. When that happens they become impressed with the importance of making a new start with clean seed, and they send to the Farm for a sample of Red Fife in order to make a new start. I have some letters with me which, with your permission, I will read to you as examples of the beneficial results obtained from the distribution of these samples of seed and from the annual reports and bulletins.

LETTERS FROM CORRESPONDENTS RE SAMPLES OF SEED AND REPORTS.

Here is one from a farmer at Moscow, Ont., Mr. John R. Brown, who says:—

'The Improved Ligowo oats I received three years ago, we sowed thirty bushels and threshed eight hundred bushels, and when we had done threshing the men looked into the granary and said that was the best turn out they had seen this year, and we were last to thresh around here. There was a lot of them wanted to get fifty or one hundred bushels, but we could not spare so many, but we are going to exchange with some of them and grind theirs for feed; so now we can see the good of experimental farms. Wishing you all success, I remain.'

Q. How do they address you when writing for samples?

A. At the Central Experimental Farm, Ottawa. There is no postage required.

By Mr. Miller:

Q. Do you give them a list from which they may make a choice of varieties?

A. We do that in the circular announcing the distribution, where the chief varieties we have are named. We have up to this date received over a thousand more applications than last year. From the North-west Territories there are a great many, from Galicians, Russians, Germans and others who cannot speak or write in English, and they get their neighbours to write for them.

Mr. C. F. Sundberg, of Sawyerville, Que., writes:—

'The oats I received two years ago are excellent. Everyone wants to get some for seed. From the four pounds you sent me I now have forty bushels of large, clean oats, the best I ever had. The name of the oats was the Tartar King.'

Another says: 'We are well pleased with the oats which I got in 1903. We sowed about three bushels on two acres that had been growing wheat for four years, and I got one hundred and seven bushels of oats.' These are all from samples two or three years from the start.

Mr. W. J. Donahoe, of Lenore, Manitoba, says:—

'Re improved Ligowo oats: Of the three pounds got in the spring of 1903 I had a bag and a half that fall. In the spring of 1903 I had ninety bushels, and I sold about forty-five of these and sowed about forty bushels myself, being the third crop and not considered good land for oats. I put eight loads of sheafs in the barn and threshed one thousand bushels. Some of those I sold oats to have pronounced them, this fall, to be the best oats they ever saw. They are certainly a good oat.'

Another man writing, Mr. T. Smith, of Morden, Manitoba, says: 'I have been trying this year the General Gordon potatoes. They do good here. My son-in-law planted three pounds got from Brandon Experimental Farm. I cut them, two eyes in a set; they gave eighty-five pounds of fine potatoes. You sent me eight pounds Improved Ligowo oats in 1901. Also done well; seventy-five bushels to the acre. The sample bag of Red Fife you sent me last did well. I have two hundred and fourteen bushels this year for seed.'

Mr. A. Beech, of Kells Post Office, Ontario, says: 'I would like to obtain a sample of oats from the free distribution this coming season, and would prefer Tartar King, or other good "side" oats. It is a great pleasure to me to receive the annual report and bulletin issued from time to time, showing the great and noble work being carried on. I consider them my school books on agriculture. Hoping you may live long and see the fruits of your labour mature, so that every thinking farmer will hold you in the same esteem as I do.'

Mr. Albert Oldroid, Devil's Lake Post Office, Assiniboia, writes: 'I take great pleasure in being able to tell you that from a sample of oats which you sent me two years ago I have now got seventeen bushels of splendid oats for seed. They are simply great.' It is evident he did not handle them very carefully, or he might have had ten times the quantity mentioned.

This is from a stranger in the country, writing from Fort William:—

'I write to thank you for the splendid reports and bulletins you sent me in answer to my application. Being a stranger to this country, it greatly surprised me to see the vast amount of valuable information to be had from your department. It is indeed a credit to the men taking part in it. Yours very sincerely,

'J. BLINCO.'

J. L. Sparrow, of Medicine Hat, writing for the last Experimental Farm Report, says:—

'I value these reports very highly, as they are really an education in themselves.'

Another man, a Frenchman in Quebec, says: 'I consider that book a real treasure for the farmer.'

Still one more. This is from J. Woodward Manning, Boston, one of the first landscape gardeners in the United States:—

'I wish to acknowledge the receipt of Bulletin No. 47, and to bear testimony to the value of this and the other publications on trees and shrubs tested in Canada. I consider them of the highest usefulness, and moreover a peculiarly convincing argument as to the salubrity of a climate too frequently understood in the State as bordering on to perpetual arctic frigidity.'

From these letters it is evident that if a farmer takes care of the small sample sent him for two years he thereafter has a good variety of seed, clean, true to name, without cost to himself beyond his own labour. One can readily understand what a great benefit this must be to the strangers coming to the country who don't know much about our varieties of seed or what is the best to grow in their special district.

By Mr. Lefurgey:

Q. Might it not readily happen through the uncertain method of advertising, depending upon an article in the newspapers, that a whole section might be left out?

A. It is just possible.

Q. Is there any method of checking up to find out whether all the sections are being served in this distribution?

A. There are scores of papers received to show that the item announcing the seed distribution has been published, but we have not adopted any regular system of checking the proportion received or of corresponding with the newspapers on this subject.

By the Chairman:

Q. But your general distribution would give you an idea of whether the country is covered?

A. Yes, it does, and I don't think there is any district of the country from which applications do not come in.

By Mr. Lefurgey:

Q. At the same time I think the method is faulty in that regard. You don't know whether all the districts are being served?

A. We watch this very carefully as the samples go out to see that every province is getting a fair proportion. Up to the present the number of samples sent out this season is 11,604, which have been distributed as follows: Ontario, 1,948; Quebec, 3,380; Prince Edward Island, 421; Nova Scotia, 1,053; New Brunswick, 945; Manitoba, 1,272; North-west Territories, 2,483, and British Columbia, 102.

By Mr. Derbyshire:

Q. You could not send one full bag to a constituency if they made a special request——

CLOVER GROWING IN ALBERTA.

By Mr. Herron:

Q. I would like to draw the professor's attention to the remarks he made about clover. I think he said clovers grow generally all over Canada successfully?

A. When speaking on that subject I had reference more particularly to the usefulness of clover to the farmers in the eastern provinces, Ontario, Quebec and the Maritime Provinces.

Q. Have you any reports regarding experiments with clovers in Alberta—anywhere in Alberta?

A. We have had a few. We have not been distributing samples of clover seed, and for that reason we have not had the amount of correspondence on that subject which we have had on varieties of grain. The government has generally said that we are expected to confine our distribution to samples of such grain as we have produced on the Experimental Farms, and not to buy seed for that purpose. Clover seed is so easily and cheaply obtained that any farmer who desires to try it can do so in an experimental way at a very small cost.

Q. I believe they have been experimenting with clovers in Alberta for many years, and I think so far with success. I would like to draw your attention to another feature—that is, that the Experimental Farms or branch Experimental Farms should be introduced to localities like Alberta, where climatic conditions are entirely different from what they are at Indian Head or any other place. I want to draw your attention to that, and at a later time I hope to get some information upon it.

A. There is no doubt that the establishment of branch Experimental Farms in Alberta would be of very great service to the farmers there.

House of Commons,
Room 62,
Wednesday, March 1, 1905.

The Select Standing Committee on Agriculture and Colonization met here this day at 10 a.m., Mr. Greenway, Chairman, presiding.

IMPORTANCE OF THE EARLY GROWING OF GRAIN.

Dr. W. Saunders was present by recall and continued his evidence as follows:—

Mr. Chairman and Gentlemen, in continuing my evidence on the general progress of agriculture, I desire first of all to call your attention to the great importance we have found at the Experimental Farm of early seeding. Some five or six years ago a series of experiments was concluded, which had been carried on for ten years, with wheat, barley and oats, where we had six successive sowings each year beginning at the very earliest time at which seed could be got in the ground, following it up week after week with a fresh seeding and then harvesting these plots all separately and threshing them separately, and publishing the results. The results for the ten years' work thus carried on gave the following returns:

Experiments with wheat sown at intervals of a week showed that a delay of one week after the time when the seed could be favourably got into the ground entailed an average loss of over 30 per cent of the crop, two weeks 40 per cent, three weeks nearly 50 per cent and four weeks 56 per cent. With oats a delay of one week resulted in an average loss of over 15 per cent, two weeks 22 per cent, three weeks over 32 per cent and four weeks about 48 per cent of the crop. In the case of barley a delay of one week resulted in an average loss of 23 per cent, two weeks 27 per cent, three weeks 40 per cent and four weeks nearly 46 per cent. These were on plots all alongside of each other, the conditions uniform in every respect, and using the same seed, the only difference being the date of sowing. The results of these experiments, which have been made widely known through the publications of the Farms, have led farmers to pay attention to early sowing, and in this way crops have been improved.

ADVANTAGES FROM THE EARLY SOWING OF FIELD ROOTS.

For many years past similar experiments have been carried on with field roots, but no special attention, beyond publishing results in the Farm publications, has been called to them up to the present time. I bring this matter before you on this occasion on account of the great importance of field root crops, especially in the provinces of Ontario, Quebec and the Maritime Provinces.

By Mr. Crawford:

Q. Do your experiments apply to Manitoba and the West the same as here?

A. Not to the same degree. The statements I have made with regard to wheat, barley and oats are applicable to Ontario, Quebec and the Maritime Provinces. We have found a smaller falling off in Manitoba from delay in seeding. The conditions of weather in the North-west seem to influence the crops so much as to counteract part of the benefit which might otherwise be expected from early sowing.

LOSS FROM DELAY IN THE SOWING OF ROOTS.

With regard to the question of roots, the plan adopted has been to sow the first sowing of roots when the ground was in good condition to receive the seed after the ordinary seeding of grain was over. The time of sowing of the first plots has generally been about the middle of May, sometimes the first week in May, depending upon whether the season was early or not. Then two weeks after the first sowing a second sowing was made under precisely similar conditions, the soil in each case being got into the same state of tilth and cultivation. Although there was an interval of two weeks between the sowings, the plots were gone over with harrows before the second sowing, so as to stir the soil and bring it into the same condition as it was at the first sowing, so that there might be no difference on that account. The gain from early sowing has been quite remarkable. In turnips at the Central Experimental Farm, taking into consideration all the varieties sown, which have usually been about twenty, and taking the average results from a five years' test, there has been a gain from early sowing averaging 10 tons 1,136 pounds per acre. Last year (1904) the gain was unusual. It was 16 tons 1,598 pounds. The conditions under which the later sowings were made otherwise were exactly similar to the first sowing.

By the Chairman:

Q. What was the difference between the times of sowing?

A. Two weeks.

By Mr. Cash:

Q. What space did they occupy?

A. There were usually four rows of a kind, and the two middle rows taken and the area of land they occupied ascertained, and that multiplied so as to ascertain the yield per acre.

By Mr. Elson:

Q. How much seed do you sow?

A. About four pounds per acre of turnip seed. From a similar series of experiments with turnips at Nappan, Nova Scotia, carried on also for five years, the gain from early sowing has averaged 7 tons 1,908 pounds per acre. With turnips grown at Brandon, Man., for the same time the gain from early sowing has averaged 6 tons 1,515 pounds per acre; at the branch Experimental Farm at Indian Head the gain from early sowing has been much less, averaging 1,630 pounds per acre during the five years' trial. At the Experimental Farm at Agassiz also the gain from early sowing is small compared with that obtained at Ottawa, Nappan and Brandon, the average gain there being 1 ton 1,140 pounds per acre. During a similar series of experiments with mangels carried on during the past five years, the following gains have been made by early sowing: At Ottawa, Ontario, an average of 12 tons 125 pounds; at Nappan, 5 tons 1,468 pounds; at Brandon, 2 tons 1,164 pounds; at Indian Head, 1 ton 1,538 pounds, and at Agassiz 3 tons 527 pounds. In a similar series of tests applied to carrots the average gain each year from early sowing was for the five years as follows:—

	Tons.	Pounds.
Ottawa	3	979
Nappan	3	666
Brandon	3	1,090
Agassiz	1	1,913

At Indian Head, where we have found great difficulty in growing carrots successfully, and where we seldom have much of a crop, the average gives a loss from early sowing of 443 pounds. That, however, would scarcely interfere with the general deductions one might feel justified in drawing as to the benefit of the early sowing of this crop.

EXPERIMENTS WITH SUGAR BEETS.

With regard to sugar beets, the average gain for five years from early sowing has been as follows:—

	Tons.	Pounds.
Ottawa	8	1,660
Nappan	3	164
Brandon	1	1,614

At Indian Head there has been an average loss of 828 pounds, and a gain at Agassiz of 923 pounds. From these figures it is evident that the question of early sowing of roots is not of so very much importance at Agassiz or at Indian Head, but at Brandon and in all the eastern provinces it makes a very large difference indeed, so large that it is well worthy of the attention of every grower of roots, since it involves losses of from 25 to 40 per cent.

By Mr. Lewis:

Q. Was that carried on for more than one year at Indian Head?
A. Yes, I have given the average of five years.
Q. Were there any special circumstances in these cases?
A. No; that was the average loss for the time named.

By Mr. McColl:

Q. How many tons of sugar beets do you grow to the acre?
A. At Ottawa the average has been 28 tons 1,287 pounds for the five years. At Nappan it has been 25 tons and 796 pounds; at Brandon, 21 tons 1,016 pounds; at Indian Head, 16 tons 728 pounds, and at Agassiz 23 tons 1,016 pounds. Those are the averages of the sugar beets grown on experimental plots.

By Mr. Gordon:

Q. What has been the sugar content of the beets?

A. That has varied considerably. Mr. Shutt, our Chemist, has given the particulars every year in the Annual Report. Speaking from memory, it runs from 12 to 14 per cent, occasionally running up to 15 and sometimes to 16 per cent. With beets in Alberta we have had it run to 16 per cent and over several times, which is a high percentage.

Q. Has the government done anything in the way of making scientific tests to see what improvements could be made in the sugar content of the beets?

A. Yes; we have imported the very best high-bred seed obtainable, which has been carefully sown in different climates and under different conditions, and the samples of the beet have been analyzed each year by the Chemist. Mr. Shutt will no doubt come before the Committee in a short time, as soon as he is required, and will be able to give you all the particulars. The average of beet sugar in Germany last year was very good, a little over 15 per cent, and Germany stands the highest of all the European countries as to yield. Russia was but little below Germany. In the United States the average was 7 tons per acre. There are fifty-three factories in the United States situated in different parts of the country. In Utah and California the percentage of sugar realized was about 10 tons. I cannot remember the particulars in the other states, but the average was 7 tons, as against 15 in Germany.

Q. The average as given by those factories does not fairly represent the tonnage. Those factories will probably have 6,000 acres contracted for, but not over 4,000 actual acres.

A. The particulars I have given have been gathered by the Statistical Branch of the United States Department of Agriculture. They have agents employed to collect the figures, and they are no doubt reasonably accurate.

By Mr. Elson:

Q. When you sow turnips earlier do you find much trouble with the turnip fly eating the leaf?

A. Of late years we have had very little difficulty with the turnip fly. Dr. Fletcher, our Entomologist, will be able to give further information on that point.

Q. You recommend sowing early? We find we must sow a little late, otherwise we are apt to lose our crop.

A. We have not found any difficulty from that cause here.

By Mr. Herron:

Q. Have you the records of the Raymond sugar factory in Alberta?

A. No; I have not been able to obtain them yet. The run, I believe, was a satisfactory one. I have seen some newspaper paragraphs to that effect, but have had no particulars from the factory itself.

Q. I think it was a very satisfactory season?

A. Yes. We have sugar beets from that district, and also from Northern Alberta, and they have given higher percentages of sugar than the beets from any other part of Canada.

Q. Well, they have given a higher percentage in the South than they have from the Calgary district. I know that from the manufacturer there?

A. Sugar beets have been sent to the Experimental Farm from up towards Edmonton from two or three different points. Later we shall be able to give information as to the results of the analyses which have been made by our Chemist.

By Mr. Wright (Muskoka):

Q. What kind of soil do the beets seem to do best in?

A. We find they do best on a good clay loam soil mixed more or less with sand. They should be grown where the soil can be got in a good condition of tilth, and if it is well stirred and cultivated to a good depth this crop will succeed very well.

Q. I come from a comparatively rough section, where there is a good deal of rock and stone, the Muskoka district, and roots of every kind do remarkably well there. I was wondering what the reason was for that?

A. We generally find in those rougher rocky districts that the soil which fills the interstices between the rocks is unusually rich, and beets and roots generally do well where you can get such soil sufficiently cultivated to give them a chance.

The only other point I wish to bring before the Committee is in reference to the progress being made in the production of cross-bred apples of a hardy character for the North-west country.

By Mr. Blain:

Q. Before you leave the subject, are there any particular kinds of roots that you would recommend for those who are compelled to sow late or sow in bad weather? What kinds would you recommend?

A. We have not found any great difference in the varieties. We have found a difference in yield, but they have all been sown at the same time. There are none of the ordinary winter-keeping roots, which seem to mature so very much earlier than others, as to give them any special advantage. In our experiments the aim has been to get information as to the best strains of seed to produce a large crop, and also the best methods of preparation of the ground, and the best time for sowing. All the details connected with that work are given in our Annual Report, so that every farmer who gets a copy of that publication can understand exactly how we have treated our roots, and there is no difficulty in his treating his land in the same way, and I presume if he did so he would get corresponding crops. Unfortunately the average farmer seems to be either deficient as to a full knowledge of the subject, or he is not careful to carry his knowledge into practice, and we find as a matter of fact that the average crops of roots in the provinces of Ontario and Manitoba where we have the details are not nearly as large as the average we get at the Experimental Farms. I do not think it would be difficult for any farmer who is on a fairly good farm, if he would treat his land in the same way as we do, to get just as good crops as we do. At present the difference is quite remarkable. The Report from the Ontario Statistical Bureau shows that the average production of field roots in Ontario falls far below the yields obtained at the Experimental Farms. There is in this respect wide margin for improvement among the farmers generally throughout the country. Therefore I thought it was well to call attention to this matter, so that the importance of early sowing might be impressed on the minds of farmers generally. The whole of our efforts are directed along the line of trying to make farming more profitable, and the more we can do in that way the nearer shall we approach the end which it was desired to gain by the establishment of experimental farms.

CROSS-BRED APPLES.

I desire now to devote a few moments to the question of cross-bred apples. As most of you are aware, the possibility of apple growing in Manitoba and the North-west has commanded a great deal of attention ever since the settlement of the country. Almost every settler who has aimed to make a homelike place of his farm has tried more or less experiments in growing trees. Naturally the orders went to nursery agents, who travelled through the country and showed fine pictures of the fruits offered. Much money was spent on trees, and in too many instances the next year found them all dead. That was a common experience, and after a time farmers began to entertain the opinion that there was no use trying to grow fruit at all, that the climate was too unfavourable. When work began at the experimental farms all the varieties for which any special hardiness was claimed were tried; some were imported from Russia, others from Norway, Sweden and other northern European countries. Those also which had been produced in the United States were tested. At one or two points in Manitoba some of the varieties obtained from Russia have succeeded fairly well. There is an orchard of apple trees at Nelson, near Morden, in Southern Manitoba, on the farm of A. P. Stevenson, who I think came before you last year, from which he has got very good crops. Most of his trees were sent from the Central Experimental Farm to him at different times for trial. They included some of the hardiest Russian sorts, and from the outset they did very well. He has a remarkably well sheltered place. There is a very heavy piece of wood to the north of his orchard, and he has planted evergreens and other trees for shelter through his grounds, which have done well, and he has the best sheltered place I have seen in Manitoba. For the last seven or eight years he has grown very fair crops of fruit, and some years very good crops. At the same time that we sent these trees to Mr. Stevenson we sent two or three times as many to Brandon and Indian Head. We have planted them there under various conditions of shelter, but we have never grown an apple from any of them, although it is twelve or fourteen years since we began these experiments. Hence we have reached the conclusion that the average farmer in Manitoba and the North-west Territories cannot grow these Russian apples; neither can he grow any of the commercial apples which are raised in other parts of the world. There may be a few localities discovered as time goes on something like the one at Nelson, where exceptional conditions can be had, but as a general rule the average farmer cannot grow any of the varieties of apples found in commerce. In 1887, the year the farms were started a package of seeds was received from the Imperial Botanic Gardens at St. Petersburg for test in Canada, and among these was a small package of the seed of a wild crab, *Pyrus baccata,* which grows in Siberia, and which produces a fruit about the size of a cherry with a long stem. This crab from the outset has proved remarkably hardy wherever it has been planted; in the open or in shelter, it makes but little difference. At Indian Head and at Brandon many of the trees grown from these seeds have been tested, and they have all come out alive to the tip every winter for the past 13 or 14 years, showing that the tree is perfectly hardy. That hardiness led us to consider the question of the improvement of the fruit. We crossed that variety with pollen from quite a number of the best apples grown in Ontario, and produced a race of seedlings which have fruited. There are about twenty out of two or three hundred that have been fruited which are of a size and quality that make them worthy of general cultivation throughout those districts where ordinary commercial apples will not succeed.

I have here an advance sheet, a plate which has been prepared for our Annual Report, showing the results of this work. These are some of the best of the crosses represented of natural size.

By Mr. Crawford:

Q. In the city of Winnipeg I know of several fruit trees that have borne fruit for the past three years.

A. What kind, may I ask? The Transcendent Crab?

Q. I do not know the name. It is an apple about the size of the largest apple you have there.

A. That is no doubt the Transcendent Crab, which has been more successful about Winnipeg than any other variety tested.

By Mr. Wright (Renfrew):

Q. It is a dark red apple?

Mr. CRAWFORD.—Yes.

A. I know of several trees in Winnipeg, and several at Brandon, that have borne fruit, and we have had fruit at the Experimental Farm at Brandon for two years past of this variety; but I do not think any farmer in any of these localities could order a dozen trees and calculate that he would have the same percentage of success in growing them that he would in the eastern part of Canada. I know in our experience at Brandon we have rarely saved more than one or two trees out of a dozen, and to-day we have only one tree I can recall that is living, although we have planted many, and have taken as good care of them and much better care than the average farmer would give them.

Q. Is the wild crab useful for commercial purposes?

A. The wild crab, *Pyrus baccata,* from which these cross-bred apples originate, is too small for commercial purposes, but the fruit makes excellent jelly, and for settlers who want to use them for that purpose I do not know of anything better. Then the trees themselves are quite ornamental when they are in blossom in the spring, and when they are hung with fruit in the autumn, and as they fruit so freely the fruit is prized very much by those settlers who have them.

Q. Did you ever cross the Canadian crab, our own crab, with the pollen of larger apples?

A. We have tested our own crab as to hardiness in the North-west. We sent 500 young trees to each farm, early in their history, and there is not a survivor of them now. Some of them lived for a year or so.

By the Hon. Mr. Fisher:

Q. You have misunderstood the question. You were asked whether you have crossed them with the Canadian crab?

A. No, we have not. Excuse me, I did not understand the question. We have not done so, because this native crab is not very hardy, and any crosses between it and our better apples would almost certainly be killed by winter. The crosses I have referred to with *Pyrus baccata* are very hardy, and are likely to be useful to the whole North-west country, and they are large enough to serve most ordinary domestic purposes. Those figured on the plate that I have passed around are some of the best that we have grown. Having gained that much success, we are following along two or three other lines of work. One is to recross those best crosses, and put in another quota of the blood of the larger fruits into them, with the view of getting them much larger. The first trees of these second crosses were planted last year in the orchard at Ottawa—one-year old trees—but it will be three or four years yet before we shall see what the fruit is like, and after we have tested the fruit, if it is valuable, we have to propagate and then test them in the North-west country. Unfortunately these experiments are necessarily slow, and they take a good slice of one's life before you can get very far. A horticulturist should live for a hundred years if he is to accomplish much.

By Mr. Cochrane:

Q. Under the care of Dr. Osler?

A. I do not know as to that.

By Mr. Jackson:

Q. Are you aware there is a large apple orchard in Stonewall?

A. Yes; I think I have referred to that.

Q. Now, I saw at least between fifty and a hundred trees last year, and each of them would have a bushel of apples on them—not these small Russian apples, but large apples.

A. Many experiments have been made with crabs in several parts of Manitoba.

Q. That was in the district where I reside, and a few years ago they planted maple trees there too.

A. Whose place do you refer to?

Q. Mr. Franklin's, of Stonewall.

A. I visited his place several years ago, and did not see any large apples such as you speak of then.

Q. These were large apples. This was the year before last; last year the frost came. He has been at it for fifteen or twenty years. I was with him for a while, but I gave it up. He has stuck to it, with the result that I have stated.

A. The year before last was a phenomenal year in Manitoba for apples. A few Duchess ripened at Brandon, and when I learned that I was in hopes that perhaps we had struck a hardy strain of Duchess, one which would produce every year. But unfortunately most of them were killed to the ground the following winter. What is wanted is a tree that will stand year after year, endure the climate and fruit regularly; that is what the average farmer wants. If he gets a taste of apples one year and all his trees are frozen the next it discourages him, but he will thoroughly appreciate a real hardy specimen which will fruit year after year. In the districts west from Winnipeg the altitude is much greater, and that increases the difficulty. Winnipeg is 740 feet, and the height above sea level at Brandon is 1,100, at Indian Head 2,000, at Calgary it runs up to 3,200 or 3,300 and the difficulties of growing fruit increase as you get to the higher altitude. These new cross-bred sorts are being tested at 200 different points between Winnipeg and the foothills of the Rocky Mountains, varying from 740 to 4,200 feet. They are all proving hardy, and in another year or two will begin to bear fruit, when their value will soon be ascertained. Several of our leading nurserymen in Canada have been supplied with scions of some of the best of these fruits, so that they may be propagated in a large way and soon become available to the public generally. These cross-bred apples are not of any value for Ontario or the eastern provinces, where much better sorts can be grown, but when a settler goes to the west and finds that he is not able to grow any sort of apples for family use unless he is fairly well off he is deprived of a very important and healthful article of diet. If he can afford it he can buy apples from Ontario, but the great bulk of farmers have very little fruit of that sort to consume, and it will be a great boon to them to get an apple of the quality or size of these cross-breds to grow freely on their own farm without any protection or special care.

By Mr. Wright:

Q. This apple is larger than the ordinary Transcendent Crab?

A. They run about the size of the Transcendant Crab. Some of these shown on the plate are a different shape, and one or two are larger than the average Transcendent Crab.

Q. Which picture represents this apple (indicating one of the samples)?

A. This one in the lower corner of the sheet of illustration.

NEED OF EXPERIMENTAL WORK IN ALBERTA.

By Mr. Herron:

Q. Have you ever taken into consideration the advisability of establishing branch experimental farms throughout the North-west? Of course you know I spoke here the other day of the large country there, and have you considered the great advantage it would be to have small farms in the various districts at which to carry on experiments with grasses of the various kinds, for instance. I believe it would be a very good thing, and it could be carried out in a small way without enormous expense. If you take into consideration the size of that country, with an entirely different climate from that of any other part of Canada, and even varying considerably in one part from another, I think it is surely worth a great deal of attention from the department. I

Missing Page

that there will be a fair contest between the cane sugar and the beet sugar, without any bounties or any interference on the part of the governments to stimulate production.

By Mr. Cash:

Q. Have you any reports of sugar beet in the section of the country between Saskatoon and Regina? Whether that will be suitable for wheat growing in comparison with the other sections of the North-west?

A. We have had no samples of sugar beets from that district. With reference to wheat growing there, I have been over that section twice during the last two years, and have seen very good crops of wheat, especially north of Regina.

Q. About Dundern?

A. Yes, all about there; and also at Saskatoon. Two years ago I drove from Saskatoon up to the Elbow, crossed the Saskatchewan there, and went on to Battleford on the north side, and down from Battleford to Saskatoon on the south side, a drive of about 200 miles, and I have never been in any part of the Territories where I have found the land so uniformly good as I did during that drive. There was no settlement there to speak of, just an odd settler here and there, but as far as the soil goes certainly it is all that can be desired, and I have no doubt that for mixed farming it will be one of the best sections of country in Canada when it is settled. All around Saskatoon settlement has gone on very rapidly during the last two years, and the same may be said of the country between Saskatoon and Battleford and for 100 miles west of Battleford.

Q. Do you think that the conditions existing at the farm at Indian Head give a very good idea of the conditions existing throughout the Territories, or do you think the conditions there are exceptional?

A. The Indian Head district is a very good district. I do not know of any better, but I think the land is about equally good in many other localities. In some other parts of the Territories, however, the land is not so uniformly good, and when compared with such districts the land about Indian Head may be truly said to be exceptional.

Q. I know that it is excellent land. Of course we have some dips and some brush?

A. Yes; when you cross the Qu'Appelle it is a little more wooded, but when you go a little west of Indian Head you strike a poor piece of land, which extends for a few miles, where the soil is light, and south of this again portions of it are light; it varies a good deal in the different districts. But the crops of wheat which have been grown on the better lands all through that country have been remarkable for the last ten years, and there seems to be no diminution in the yields they are getting. It is difficult to speak of such a big country in a general way. It is necessary to go over each locality carefully to find out what the differences are and how far these differences in the quality of the land extend before you can venture to offer an opinion on them.

Having read the foregoing transcripts of my evidence, I find them correct.

WM. SAUNDERS,
Director Dominion Experimental Farms.